

**Saddleback Ridge Wind, LLC** // Natural Resource Protection Act  
(NRPA) and Site Location of Development Act applications

- Licensee Exhibit 4  
Memorandum from RSG to Andy Novey  
(December 20, 2010)



## MEMORANDUM

<b>To:</b>	Andy Novey
<b>From:</b>	Kenneth Kaliski, INCE Bd. Cert.
<b>Subject:</b>	Response to Mr. Brown's December 2 comments regarding Saddleback Ridge Wind (SRW)
<b>Date:</b>	20 December 2010

This memo provides responses to Mr. Rufus Brown's questions to Eric Ham of December 2, 2010:

1. *How was the modeling done to take into account line source measurements vs. point source. There is a general discussion in Section 3.4 of the report, but no discussion of what actually was done. Can we see the actual calculations? Can the tolerances be described? If it can be done, can Mr. Kaliski run the model using just point sources?*

The model was run by representing each wind turbine as a point source at hub height. The discussion in Section 3.4 regarding line and point sources concludes that a line source and closely spaced point sources behave similarly within a specified range from the source. Thus, a line source can be modeled as closely spaced point sources. Closely spaced point sources exhibit line source attenuation (i.e. 3 dB per doubling of distance) between distances of about  $D/3$  and  $L/3$  perpendicular from the source string, where  $D$  is the spacing between the point sources and  $L$  is the length of the string of sources. For SRW, we see roughly 3 dB per doubling of distance out to about 1,900 feet perpendicular from the turbine string. The attenuation rate increases as one moves beyond this as a result of both the mechanism discussed above and atmospheric absorption.

The question asks for a comparison of line and point source models. Since a line source model was not run for the noise study in the application, we re-modeled the project to represent the turbine string as a true line source rather than a series of point sources. A line source was created that ran from the southern end of the project to the northern end, with vertices at the hub of each turbine, and an assigned sound power level over the length of the line source equal to all of the turbines combined. This line source model was run using the same ground factor, temperature, and humidity as the point source model run in the noise report.

Figure 1 shows the difference between the line source and point source results. The line source results are lower to the north and south of the project, because the sound power from the northern- and southern-most turbines is distributed along the line rather than concentrated in points (turbines) at both ends of the project layout. At homes to the east and southeast, there is essentially no difference between the point and line source model results. The line source results are higher in between the turbines. This is expected, as the line source method models sound emissions in places where there were no point sources (i.e. in between turbines).

While both models give roughly equivalent results perpendicular to the turbine string, we believe the line source model does not accurately represent impacts along the turbine string axis. As a result, the point source model, as used in the Saddleback Ridge Wind application, represents the better approach to modeling sound propagation from the wind farm.

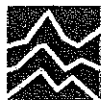
Cadna input and output files for both the point source run provided in the application and line source run introduced here are available for download for 15 days at:

Host: <ftp://ftp.rsginc.com>  
Username: saddleback  
Password: %\$asd&6v





Figure 1: Difference between line source and point source model results, calculated as line source minus point source grid. Red colors indicate higher and green colors indicate lower levels in the line source model compared with the point source models.



Andy Novey  
20 December 2010

Resource Systems Group, Inc.  
page 4

2. *We see no inclusion of a 3 dBA error factor for modeling required by the Department post-Mars Hill. Has Mr. Kaliski included this error factor in his modeling?*

The modeling in this case uses a different, but similarly conservative approach. Rather than using a ground factor of 0.5 and then adding a 3 dB correction, as has been done in some other applications in Maine, we used a ground factor of 0 without a 3 dB correction. A ground factor of 0 represents hard non-porous ground, like pavement, over the entire modeling area. This results in a ground attenuation factor ( $A_{gr}$ ) of -3 to -4 dB, meaning, in this case, that 3 to 4 dB is added to the overall sound level, depending on frequency, source and receiver height, and propagation distance.

3. *Can Mr. Kaliski give us the calculations to show how he modeled for atmospheric stability. See Section 8.3 and 8.4 of his report*

The ISO 9613-2 standard assumes downwind propagation, or equivalently, a moderate nighttime inversion. No other atmospheric stability conditions were modeled.

4. *Can Mr. Kaliski give us all his modeling calculations on low frequency sound propagation? Was the model run using the octave band  $L_w$  values or using the over-all A-weighted values?*

Modeling was done using octave band sound power, and the results in Section 9.2.2 are unweighted. The input and output files are provided on the FTP site noted in Response 1.



